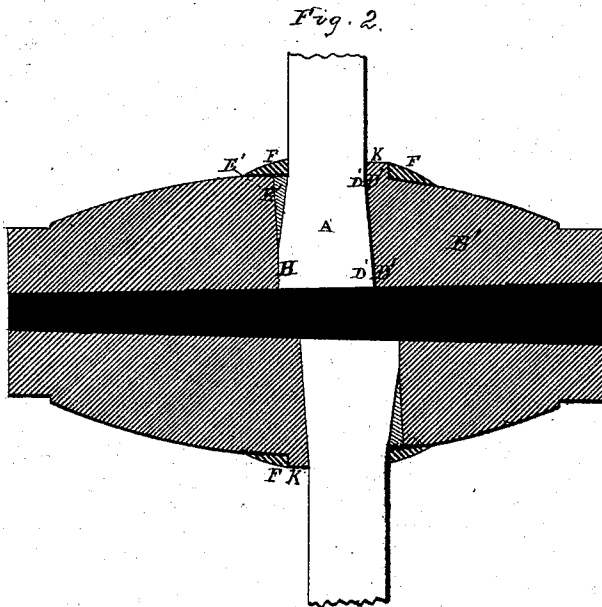
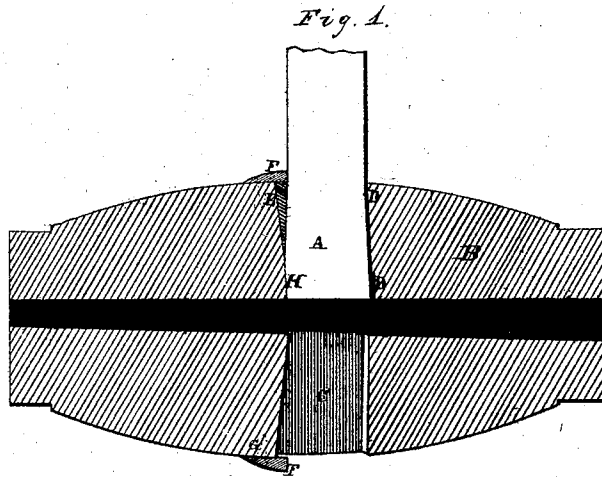


J. F. DOWNING & W. DOWNING.

Wheels for Vehicles.

No. 135,701.

Patented Feb. 11, 1873.



Witnesses.

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# UNITED STATES PATENT OFFICE.

JEROME F. DOWNING AND WELLINGTON DOWNING, OF ERIE, PA.

## IMPROVEMENT IN WHEELS FOR VEHICLES.

Specification forming part of Letters Patent No. 135,701, dated February 11, 1873.

*To all whom it may concern:*

Be it known that we, JEROME F. DOWNING and WELLINGTON DOWNING, of Erie, county of Erie and State of Pennsylvania, have invented certain Improvements, new and useful, in Wheels for Carriages and other Vehicles, of which the following is a specification, reference being had to the accompanying drawing and to the letters of reference marked thereon.

The chief feature of our invention consists in the manner of mortising the hub, which is of wood, the peculiar formation of the tenons of the spokes, and the means of securing the same firmly in the hub. The main object sought to be accomplished is the dovetailing together of the spoke-tenons and the hub. To this end the hub—a longitudinal section of which is shown at B, Fig. 1, and also at B', Fig. 2—is mortised so that the narrow sides of the mortises opposite the ends of the hub are slanted or inclined in the same direction, while at the same time they are made to converge slightly in the direction of the center of the hub, as shown at C, Fig. 1. The inclination or slant of one of the said narrow sides of each mortise is made to conform to the angle or bevel of the corresponding side of the spoke-tenon A, so as to form a close joint with the same throughout its entire length, when the parts are united together, as shown at D D, Fig. 1, and at D' D', Fig. 2. This constitutes a part, it will be seen, of the process of dovetailing.

Having a hub mortised as above described, we make the tenons of the spokes in dovetail form, as shown at A, Fig. 1, and at A', Fig. 2, with a bevel on one side, as at H, Fig. 1, which bevel is made to correspond to the angle of the narrow side of the mortise, which it presses against when in place, and serves the purpose of facilitating the forcing of the tenon to its place in the mortise, and, in connection with the shoulders of the tenon, of preventing the spoke from being forced further into the hub after the wheel is in use. The side of the mortise which comes in contact with the beveled part of the tenon at H, Fig. 1, serves as an inclined plane to force the tenon firmly against the opposite side of the mortise, and, at same time, by reason of the mortise being narrower at the bottom than at the top, as already described, assists in supporting the spoke, as stated.

The tenons of the spokes having been inserted in the hub in the manner described, it will be seen that a wedge-shaped cavity is formed between one of the narrow sides of each mortise and the spoke-tenon opposite. These cavities are then filled by driving into same tightly the wooden wedges, as indicated and shown by the wedge E, Fig. 1, and E', Fig. 2. This wedging completes the process of dovetailing.

The tenons and wedges are well glued when inserted in the hub; but, to prevent the wedges from being forced out of place, the metallic band F, Fig. 1, is forced on over the hub close up to the sides of the spokes and covering the ends of the wedges, as shown in the drawing. To prevent said band from slipping back on the hub, in case the hub should shrink, several screws are inserted through the band into the hub, as shown at G, Fig. 1.

Our invention contemplates the making of wheels with the spokes set straight in the hub, as in Fig. 1 of the drawing, or zigzag, as shown by the drawing, Fig. 2. When set zigzag the mortises are formed so as to leave the cavities for the wedges on opposite sides of the spokes alternately, as shown in drawing, Fig. 2. In this case two metallic bands are used to hold the wedges in place—one on either side of the spokes, as shown at F F, Fig. 2. To prevent any depression of the hub between the bands we raise or enlarge the circumferential surface of that portion of the hub so as to be flush with the bands contiguous thereto, as shown at K K, Fig. 2.

A wheel constructed as above described is strong and durable. The tenons of the spokes are not weakened by too much cutting away, and, being securely dovetailed with the hub, cannot be forced from their places.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The spoke-tenon A, shaped as required in dovetailing, and with one of the narrow sides beveled, as at H, in combination with the mortised hub B, having mortises with the narrow sides opposite the ends of the hub converging in the direction of the center of the hub, but slanting or inclined the same way, so as to leave a space between one of the said narrow sides of each mortise and the spoke-tenon opposite, to permit of the insertion of the dovetailing

wedge E, all constructed substantially as and for the purpose specified.

2. The wedge E employed for the purpose of completing the dovetailing of the spoke-tenon A with the mortised hub B, in combination with the mortised hub B and metallic bands F, substantially as described and shown.

3. The combination of the spoke-tenon A with the mortised hub B, the dovetailing wedge

E, and metallic bands F, all constructed and secured together substantially in the manner described, and for the purpose set forth.

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